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Left superior vena cava draining to left atrium with partially anomalous pulmonary venous connection and left-to-right shunt – multimodality imaging and percutaneous treatment

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A 4-year-old asymptomatic girl with systolic murmur was referred to a pediatric cardiologist. Transthoracic echocardiography revealed persistent left superior vena cava (LSVC) with a communication to the left atrium (LA) and flow directed upwards to the bridging vein introducing a left-to-right shunt. There was no interatrial communication. The coronary sinus was normal, and there was a hemiazygos vein draining to the LSVC.

Previously introduced cases with the LSVC draining directly to the LA have demonstrated a right-to-left shunt and a risk of paradoxical thromboembolism [1–4]. The left-to-right shunt detected in our patient was confusing. Therefore, cardiac magnetic resonance imaging (MRI) and computed tomography (CT) were programmed.

Magnetic resonance imaging detected a QP : QS ratio of 1.6 and increased volume of the right ventricle (Z-score + 4).

Cardiac CT confirmed the LSVC to LA connection with a suspicion of the left upper pulmonary vein (LUPV) draining to the LSVC. Cardiac catheterization with hemodynamic measurements and LSVC and pulmonary wedge angiograms was performed. Angiograms confirmed

an unobstructed connection of the LSVC to the LA. The LUPV drained to the LSVC with the flow towards both the bridging vein and the LA (Figure 1). Pressure measurements were normal: right atrium 7/5/5 mm Hg, right ventricle 24/6 mm Hg, and left ventricle 88/8 mm Hg. The oxygen saturation measured 99% in the LSVC, 79% in the right superior vena cava (RSVC) high above the junction with the bridging vein, 87% in the pulmonary artery and 99% in the left ventricle with a QP : QS ratio of 1.67. An Amplatzer Duct Occluder device (12/10 mm) was placed in the LSVC below the hemiazygos vein – just above the orifice of the LUPV – thereby redirecting the LUPV flow to the LA.

Cardiac MRI, CT and transthoracic echocardiography are well established in determining pulmonary and systemic venous drainage. In this case, cardiac catheterization confirmed the connection of the LUPV to the LSVC and explained the left-to-right shunt which then could be closed percutaneously.

Conflict of interest

The authors declare no conflict of interest.

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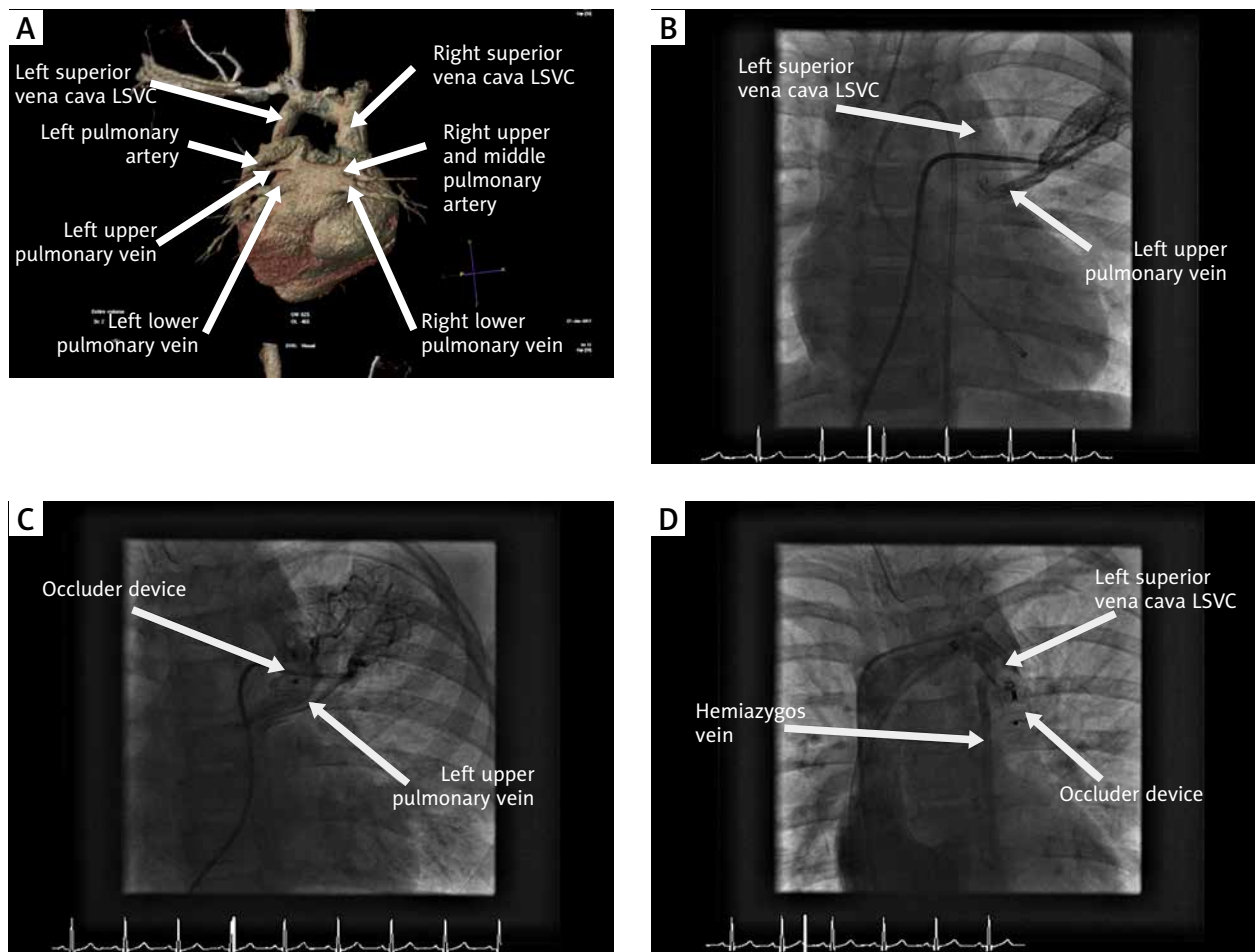


Figure 1. **A** – Computed tomography reconstruction: the left superior vena cava draining to the left atrium with a suspicion of the left upper pulmonary vein draining to the left superior vena cava, **B** – angiography: the left upper pulmonary vein draining to the left superior vena cava with the flow towards both the bridging vein and the left atrium, **C, D** – Angiography after implantation of an Amplatzer Duct Occluder device (12/10 mm) in the left superior vena cava, below the hemiazygos vein and just above the orifice of the left upper pulmonary vein, with the left upper pulmonary vein flow redirected to the left atrium

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